



Natural Resources Conservation Service
CONSERVATION PRACTICE STANDARD
AGRICHEMICAL HANDLING FACILITY
CODE 309
(no)

DEFINITION

A facility with an impervious surface to provide an environmentally safe area for the handling of onfarm agrichemicals.

PURPOSE

This practice is used to accomplish one or more of the following purposes:

- Reduce pollution to surface and ground water
- Reduce impacts to air quality
- Prevent the concentration of agrichemicals in the soil

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where—

- An area or structure is needed to properly manage and handle agrichemicals (e.g., store, mix, load, and readily clean-up agrichemicals that are spilled or leaked).
- Water is available for filling application equipment tanks, rinsing application equipment, and chemical containers, as needed for the operation.

This standard does not apply to the handling or storage of fuels. This standard does not apply to commercial or multi-landowner agrichemical handling operations.

CRITERIA

General Criteria Applicable to All Purposes

Plan, design, and construct agrichemical handling facilities to meet all Federal, Tribal, State, and local regulations.

Ensure that soils and topography are suitable for the agrichemical facility.

Base the size of the agrichemical storage on the maximum agrichemical use on the farm for a single growing season from any of the last 5 years.

Ensure the chemical compatibility of materials in the pad, hoses, pipes, valves, seals, connectors, filters, tanks, and related plumbing are compatible with the agrichemicals being handled and capable of withstanding the intended use.

Do not include outlet drains in the agrichemical collection, storage, or handling areas.

Design containment volumes to be leakproof (watertight and chemical-tight, as pertinent).

Do not construct posts, pipes, hoses, discharge valves, or other features that pass through the floor, containment storage walls, or the sumps.

Provide secondary containment to collect any drips or spills where (1) the agrichemical handling facility (AHF) is separated from the mixing/loading area; (2) where transfer of agrichemicals occurs to load application equipment. Install a shutoff valve or dry-break hose connection where the liquid fertilizer tank discharge is at a higher elevation than the handling pad.

When a combined volume of more than 60 gallons of Class I, II, or III flammable or combustible liquids, or a single storage container larger than 5 gallons of Class I, II, or III flammable or combustible liquids are stored in an agrichemical handling facility, follow National Fire Protection Association (NFPA) 30, "Flammable and Combustible Liquids Code," Chapter 4. Storage cabinets or other remedies are required.

Provide adequate storage areas for agrichemicals. Provide appropriate barriers and safeguards between the mixing, handling, and storage areas

Criteria for Permanent Facilities

Location

Locate the agrichemical handling facility—

- Adjacent to or as near as practical to the existing agrichemical storage building.
- As far as practical and at a minimum hydraulic flow path distance of 100-foot setback from streams, ponds, lakes, wetlands, and sinkholes.
- As far as practical, isolated and located downwind from residences and other buildings used to store feed, seed, petroleum products, or livestock, using the prevailing wind direction during the primary use of the facility or a minimum distance as required by pertinent regulations.
- At sites that have not been previously used for stationary pesticide storage and/or mixing/loading sites that may have been contaminated in the past.

Locate the bottom of the facility a minimum of 2 feet above the seasonal high water table.

Artificially lowering the water table would be acceptable under the following conditions:

- The artificial drainage system should be located based on the state's drainage guide or is at least 20 feet horizontally from any portion of the agrichemical handling facility including mixing/loading and transfer areas, whichever is larger.
- The drawdown is analyzed using the ellipse equation or pertinent ground water modeling for the site to illustrate the modified seasonal high water table.
- The artificial drainage system discharges to an observable sump with a shutoff valve on the outlet pipe for monitoring in the event an agrichemical spill occurs at the agrichemical handling facility.
- Facilities with this type of drainage design must be approved by the state conservation engineer.

Locate facilities above the 100-year floodplain elevation. However, if site restrictions require location within a floodplain, design to protect the facility from inundation and damage from the 25-year flood event, or larger if required by laws, rules, and regulations.

Agrichemical handling pad

Size the pad to accommodate the largest spraying equipment. Design equipment access from more than one direction. Provide adequate space for user access on the pad for maneuverability around equipment. Use a minimum of 2 feet for open facilities or 4 feet for enclosed facilities per side horizontally. When practical, base the minimum width of the mixing pad on the width of the spray equipment with the booms retracted.

Slope all floors to allow for drainage to a watertight collection area or sump.

Design apron access into the facility to minimize tire debris onto the handling pad.

Design storage capacity

The containment area capacities are to be independently sized.

Handling Pad.—Provide a minimum storage volume on the agrichemical handling pad of 250 gallons or 1.25 times the volume of the largest storage or spray tank on the pad, whichever is greater.

Agrichemical Handling Facility.—Provide a minimum storage volume of 1.1 times the volume of the largest storage container within the containment area, plus the displacement volume that is occupied by all the other tanks within and below the height of the containment wall or dike.

For unroofed facilities, provide storage as stated above and the volume of the 25-year, 24-hour storm.

Agrichemical collection

Provide a collection area or sump with adequate dimensions for sediment removal and pump operation. Use a manually activated pump to remove accumulated liquids.

Equipment wash bay

An equipment wash bay may be included as part of the agrichemical handling facility. If included, separate the wash bay from any dry agrichemical storage area. A sump common to the mixing/handling area and the wash bay is allowed.

Rinsate tanks

Provide rinsate tanks of adequate number and size as needed for the type of operation, allowing for separation of noncompatible agrichemicals.

Manufactured components

Use manufactured tanks and components that are structurally sound, capable of withstanding all anticipated loads, and constructed of suitable materials for their intended use. Base the tank sizes on the farm owner or operator agrichemical needs.

Liquid tight

Design the agrichemical handling pad and other areas needing to be liquid-tight with either a flexible membrane liner or according to the structural design section for liquid-tight concrete. Use materials that are resistant to agrichemical deterioration.

Flexible membrane liners

All flexible membrane installations will meet the material and installation requirements of the plans and specifications provided for each installation. Meet or exceed membrane thicknesses presented in table 1.

Construct flexible membrane liners under the supervision of a qualified representative of the manufacturer. Test all field-constructed seams and repair in accordance with the manufacturer's recommendations.

Table 1. Minimum Thickness for Membranes

Membrane Type	Minimum Thickness
HDPE	60 mil thickness
LLDPE	40 mil thickness
PVC	40 mil thickness
FPP-R	36 mil thickness
EPDM	45 mil thickness

Concrete exposed to agrichemicals

Design reinforced concrete in accordance with NRCS National Engineering Manual (NEM) (Title 210), Part 536, "Structural Engineering," Sections 536.21 and 536.22C.

Provide a chemically resistant coating to line, seal, and protect the concrete surface, where applicable, to any portion of the concrete subject to continual exposure of caustic agrichemicals or the abrasive effects of prolonged spray, such as might occur from a leaking pressurized vessel. Install coatings in accordance with the manufacturer's recommendations.

Structural design

Design structures with reinforced concrete, steel, wood, or masonry materials in accordance with 210-NEM-536. Account for all items that will influence the performance of the structure, including loading assumptions, durability, serviceability, material properties, and construction quality. Ensure that the material used for a fabricated structure is compatible with the agrichemicals to be stored.

When using a roof/building to cover the facility, use NRCS Conservation Practice Standard (CPS) Roofs and Covers (Code 367).

Locate footings below the anticipated frost depth unless measures are designed to accommodate frost/freeze conditions.

Design permanent structures according to the criteria in the following references as appropriate:

- Timber.—“National Design Specifications for Wood Construction,” American Forest and Paper Association.
- Steel.—“Manual of Steel Construction,” American Institute of Steel Construction (AISC).
- Masonry.—“Building Code Requirements for Masonry Structures,” American Concrete Institute (ACI) 530.
- Concrete non-liquid tight.—“Building Code Requirements for Reinforced Concrete,” (ACI 318) for concrete structures; “Guide for the Design and Construction of Concrete Parking Lots,” (ACI 330R) for slabs-on-ground subject to distributed stationary loads, light vehicular traffic, or infrequent use by heavy trucks or agricultural equipment; “Guide to Design of Slabs-on-Ground,” (ACI 360R) for slabs-on-ground subject to regular or frequent heavy truck or heavy agricultural equipment traffic.
- Concrete liquid tight.—“Structural Engineering,” 210-NEM-536; “Requirements for Environmental Concrete Structures, Slabs-on-Soil,” (ACI 350), Appendix H, for concrete slabs.

Water supply

Provide an adequate water supply for mixing agrichemicals, rinsing tanks and containers, and for emergency health and safety needs as appropriate for the facility. Provide all pipelines and hoses with backflow prevention and other hardware, as needed.

Safety

Provide appropriate barriers, fences, doors, roofs, and other means or structures to keep unqualified workers, visitors, children, wildlife, and pets from entering restricted areas of the agrichemical facility.

Include appropriate safety features to minimize the hazards of the facility. Provide warning signs, emergency eyewash station, deluge shower, spill response kits, fire extinguishers, and other devices as appropriate, to ensure the safety of humans. Provide personal protective equipment where applicable. Provide adequate ventilation at all times for enclosed buildings using natural or mechanical means.

Vegetation

Use vegetation to stabilize adjacent disturbed areas, as necessary, using the criteria listed under “Establishment of Vegetation” in NRCS CPS Critical Area Planting (Code 342) and the State planting guide to prevent erosion, as applicable.

Criteria for Portable Facilities

A portable agrichemical handling facility is a manufactured portable device that can be easily moved from field to field and will meet the needs of the user.

Pad

Construct the pad of durable material that is chemically resistant for the intended agrichemicals. The minimum containment capacity of the pad is 1.25 times the volume of the largest individual agrichemical container or tank that will be located on the pad. Include a sump or other provisions for easy recovery of spilled liquids.

CONSIDERATIONS

Determine and list all agrichemicals scheduled for use in the facility. Acquire official chemical labels, compile the associated design concerns pertinent to all scheduled agrichemicals (e.g., flammability, corrosive action, volatility, toxicity, and incompatibilities), and establish easy access to the chemical label information for personnel use while working at the facility.

For permanent facilities, design the agrichemical handling facility for corresponding increases in water use at the site from the mixing of agrichemicals and rinsing of agrichemical sprayers, containers, and agrichemical handling pad.

Install rinsing devices so that residual contents of agrichemical containers can be adequately evacuated from agrichemical containers. The rinse system may be designed to operate from the nurse tank discharge pump or a separate pump that provides adequate pressure. Verify with the manufacturer of the facility that any pump to be used in pressure rinsing is compatible with the rinse device. Dispose of clean, empty agrichemical containers in accordance with local and State requirements.

Provide a roof over permanent facilities.

Minimize sediment transport onto the pad by installing an apron at the facility entrance. Inform users of procedures to minimize and remove sediment from equipment and other sources from entering the facility.

For conditions that do not allow for independent sediment removal from tractors and equipment prior to entrance, design appropriate systems to capture sediments separately for proper disposal.

Provide a mixing platform for filling agrichemical sprayers.

For ventilation of enclosed buildings, apply NRCS CPS Air Filtration and Scrubbing (Code 371) to reduce pollutant emissions.

For portable handling facilities, consider using a top or bottom-loading valve with built-in check valve in the hose from the nurse tank to the spray tank. This will enable the operator to remain on the ground while filling the sprayer.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for a permanent facility that describe the requirements for applying this practice. At a minimum, include—

- A plan view of facility layout.
- Pertinent elevations of the facility.
- Location of water features.
- Location of electrical lines, gas lines, and requirements for burial and quality of materials.
- Structural details of all components.
- Electrical details of all components.
- Plumbing details of all components.
- Locations and details of safety features.
- Design information and building dimensions where a roof structure is used to protect the facility.
- Ingress/egress to the facility.

- Vegetative requirements.
- Quantities.
- Drainage/grading plan if needed.
- Soil and foundation findings.
- Temporary erosion control measures during construction.

For a portable agrichemical handling facility, provide plans that clearly specify the requirements for such a facility and the locations where the facility may be used.

OPERATION AND MAINTENANCE

Develop an operation and maintenance (O&M) plan that is consistent with the purpose of the practice, the intended design life, safety requirements, design criteria, and all local, State, and Federal laws and regulations.

As a minimum the O&M Plan will include, where appropriate:

- Brief description of the facility. Define parameters used to size and design the facility such as storage tank and equipment sizes.
- The facility will not be used for purposes other than the storing, mixing, loading, cleaning, and maintenance of materials and equipment used for agrichemical application.
- Provide an updated inventory of agrichemicals to be stored or handled at the facility.
- Maintain safety data sheets (SDS) for all scheduled agrichemicals available onsite.
- Identify chemical incompatibilities to properly store agrichemicals until disposal.
- The proposed method of handling and disposing of rinsate, washwater, and spills according to the agrichemical label within 72 hours following the rain or spill event..
- The process for handling accumulated rainfall.
- The process for handling accumulated sediment.
- The strategy for cleaning surfaces between different agrichemical mixing operations.
- An inspection plan of structural components such as the condition of concrete, curbing, sump(s), access roads, building structure, etc. Note the timing of inspections, conditions that would cause concern, and required actions as appropriate.
- Any weekly, monthly, or annual maintenance that may be necessary for the proper functioning of the system components including, but not limited to, concrete surfaces, sumps, pumps, hoses, pipelines, building materials, electrical equipment, and other materials and equipment.
- A schedule of any required written inspection and maintenance reports.
- Proper guidance for seasonal shutdown of the facility.
- Safety signage.
- Maintain personnel training for up-to-date safety procedures and corresponding certificates.
- Limit facility access to required personnel only.
- Maintain barriers to keep animals away from the facility.
- An emergency response plan with safety procedures in the event of an accidental spill, exposure, fire, or other hazardous incident. Provide a list of safety equipment, contact names, and phone numbers.
- Require personnel to possess a functioning charged cell phone or other communication device for emergency contact in the event the facility has no phone for this purpose.
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REFERENCES

40 CFR Subchapter E, Part 165—Standards for Pesticide Containment Structures, Sections 165.80–165.97. Accessed September 4, 2020. <https://www.ecfr.gov/>

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American Institute of Steel Construction. Steel Construction Manual, 15th Edition, Chicago, IL.

American Society of Civil Engineers. 2017. ASCE 7-16, Minimum Design Loads and Associated Criteria for Buildings and Other Structures. Reston, VA.

International Code Council. 2018. International Building Code, 2018. Whittier, CA.

Midwest Plan Service. 1995. Designing Facilities for Pesticide and Fertilizer Containment (MWPS-37). Ames, IA.

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Sumner, P.E., and M.J. Bader. 2012. Pesticide Storage and Mixing Facilities. Bulletin 1095, University of Georgia Cooperative Extension. Athens, GA.

USDA NRCS. Field Office Technical Guide, Section IV, Conservation Practice Standard - Agrichemical Handling Facility, 309.